

# COMPARATIVE ANALYSIS BETWEEN THE MILITARY ENGINEERING STRUCTURES IN THE ROMANIAN ARMY COMMANDS, WITH THOSE IN THE NATO COMMANDS OR WITHIN THE ARMIES OF SOME NATO MEMBER STATES

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**Abstract:** *After joining the North Atlantic Alliance, the Romanian Army began a process of doctrinal alignment, followed by the reorganization of command-control and force structures. By default, the military engineering staff structures were transformed. As I consider that these staff structures have not been adequately reorganized, I set out to make a comparative analysis of them with the military engineering structures in the organization of the commands of armies belonging to NATO member states and with those within NATO commands, at strategic, operational and tactical levels. Subsequently, I will use the data of the analysis, corroborated with other conclusions resulting from previous research, to propose to the military leadership factors the reorganization of the military engineering command structures. We believe that after a new reorganization, these military engineering structures in the composition of our commands must be able to ensure, on the one hand, the correspondence of duties with those of similar structures within the Alliance's commands and, on the other hand, the possibility of exercising on behalf of the commander, command and control over all capabilities.*

**Keywords:** *military engineering structures; command-control; commands; areas of expertise; staff capabilities.*

## Introduction

Recently, the Romanian military has participated in a series of missions in various theaters of operations in Bosnia-Herzegovina, Kosovo, Iraq, and Afghanistan, along with soldiers belonging to NATO member states or partners. Among them were the Romanian engineers, of all categories. The experience gained in operations and teamwork with soldiers from other armies has had a great influence on both commanders and staff, in terms of how to plan and carry out operations. To all this can be added the participation in numerous multinational training exercises and activities, the participation in various training courses conducted abroad, and the assignment of positions within NATO headquarters, which combined with the implementation of NATO standards in the field of military engineering (MILENG) support have contributed to the interoperability of the MILENG forces of the Romanian Army with those within the armies of some NATO member states. Also, the implementation of NATO doctrinal provisions, on the line of MILENG, has generated significant changes in the role, functions, and missions of MILENG structures, both command and forces. (G-1, Doctrina sprijinului de geniu în operațiile întrunite 2016, 9)

The NATO Standardization Agreement (STANAG) has established that NATO forces, as well as partner forces, can work together more effectively if they share a common set of standards. Thus, STANGs are documents that specify the agreement of member countries to implement certain standards. (NATO Encyclopedia 2019 2019, 560-561)

Thus, in the field of MILENG, teams of specialists from NATO member states have developed standards on the command and control of MILENG structures and also on the tasks of MILENG support in times of peace, crisis, and war, as well as in post-conflict situations. In this regard, we mention the last two versions of the NATO standard AJP-3.12, *Allied Joint Doctrine for MILENG*, Edition B, Version 1 of 2014, and Edition C, Version 1 of 2021. The version of the NATO Doctrine published in 2014 has been implemented in the national

regulations by G-1, *The doctrine of MILENG support in joint operations* was published in 2016. The NATO version published in 2021, is being implemented in the Romanian Army through a new edition of the national doctrine of support which is being developed and which aims to establish guidelines for the command and control of MILENG structures, vertical and horizontal collaborative relationships, as well as several elements regarding the tasks of MILENG support in various situations.

In the following lines, I intend to make a brief presentation of the organization of the MILENG structures within the Romanian Army commands, within the NATO commands, or within the armies of some NATO member states, from different hierarchical levels. I also set out to refer to the horizontal or vertical co-operation relations and some clarifications regarding their general responsibilities, depending on the information available to me at the moment. In general, the information about the organizational structures of some entities within the commands/staff has a high level of secrecy, so the information available to them is not always complete. I mention that in this analysis I use only unclassified information. However, by correlating and analyzing what is available, I believe that I have been able to make appropriate inferences about the organization and role of structures within NATO or foreign military commands.

As the new NATO doctrinal provisions, in line with MILENG, are being implemented in the Romanian Army, the purpose of my efforts is to make an analysis and a presentation for the most appropriate popularization of these provisions, and will finally make proposals to the decision-makers, to modify the MILENG command structures in the Romanian Army.

## **1. General information on the organization of MILENG structures in accordance with the doctrinal provisions of NATO**

MILENG support is an inherent aspect of all combined functions (manoeuvre, fire support, command and control, intelligence support, force protection and civilian-military cooperation), at any level of command, in any type of mission, campaign or operation and in all phases. The incorporates various areas such as combat and force engineering support, Explosive Ordnance Disposal (EOD), environmental protection, military search and infrastructure management which also includes contracts concluded with civilian companies on the line of MILENG. Also makes a significant contribution to countering improvised explosive (C-IED), force protection and providing life support. (MC 0560/2 Military Committee Policy for 2017, 3)

MILENG activity as a function is led and coordinated by staff/command structures. In accordance with the guidelines of the Military Committee, the provision of effective MILENG support requires appropriate command and staff structures of MILENG, as well as command-control (C2) arrangements at all levels. (MC 0560/2 Military Committee Policy for 2017, 3)

The most efficient use of resources will be achieved by a *chief of MILENG advisor*, existing at each command level, who is able to organize the multinational capabilities according to the general priorities of the commander, during an operation; responsibility for the execution of tasks must be delegated to the lowest appropriate level of command. The *chief of MILENG* has the technical and coordinating authority for all available resources. (AJP-3.12 (C), Allied Joint Doctrine for 2021, 2-1 - 2-2)

In accordance with NATO doctrinal regulations for MILENG (AJP-3.12 (C)), the MILENG command structures must be robust, well-organized, independent, have a range of staff capabilities, and be able to manage accordingly problems on the line of MILENG. Depending on the tactical situation and the type of operation, it may be necessary to augment the structure with additional specialized personnel.

Thus, these command structures must have in the organization the following: *Plans, Operations, Intelligence, Infrastructure, Logistics, EOD*.

## **2. The structures from the organization of the Romanian Army commands**

In accordance with the specific national regulations (Romanian Constitution; Law no. 346/2006 on the organization and functioning of the MoD; White Paper on Defense 2021; Romania's Military Strategy 2021), regarding the command structure of the Romanian Army, it ensures the leadership in peacetime, at the establishment of the state of siege, the declaration of the state of mobilization and/or of the state of war or for the resolution of the missions in case of civil emergencies.

*2.1. At the strategic level, in peacetime*, the leadership of the force structure of the Romanian Army is exercised by the Chief of the Defense Staff. He exercises command and control through the Chiefs of Staff of the Land, Air, and Naval Forces and the commanders of the Joint Forces Command and other commands, in accordance with the Romanian Constitution, the laws, orders, and instructions of the Minister of National Defense.

*When establishing the state of siege, declaring the state of mobilization, and/or the state of war* the management of military actions are carried out, at *the strategic level* by the commander of the National Military Command Center, and at *the operational level* by the commander of the Joint Forces Command (JFC) and the heads of components/operational centers of the National Security System.

The National Military Command Center Commander ensures the coordination of the inter-institutional effort to carry out the country's defense actions and the leadership of the armed forces in cooperation with the central public administration authorities and the public institutions from the NHS.

Regarding *the MILENG command structures at the strategic level*, in the *peace organization* of Defense Staff, within the Operations Directorate, there is an *MILENG, EOD and C-IED Office*. The general tasks of the office, in peacetime, are the following: it provides advice and expertise for chiefs on the specialized line; develops MILENG, EOD and C-IED policies, concepts, conceptions, and doctrines; coordinates the development of standard operating instructions, manuals and procedures; contributes to the elaboration of different plans; cooperates with *NATO Centers of Excellence*; is part of the selection committees for the placement of specialized positions within NATO headquarters and within NATO Centers of Excellence; contributes to and participates in the planning of the various command exercises; organizes and conducts annual meetings with the heads of engineering and EOD structures; is a permanent point of contact with other national or NATO institutions and organizations, etc.

The staff of this office coordinates the activities on the specialized line (MILENG, EOD and C-IED) and elaborates specific tasks on the specialized line for the MILENG offices within the subordinate echelons.

*2.2. At the operational level*, as mentioned above, the Joint Forces Command exercises the functions of planning, leadership, and coordination that belong to the echelon of the operational level in the Romanian Army.

Within the J.3 - Operations of the JFC there is the *Combat Engineering Office*. The tasks of the Office are similar to those at the strategic level. Office personnel, in peacetime, prepare for battle, contribute to the development of defense plans, orders for structures carrying out various international missions, and the planning of various command and field exercises. He also contributes to the elaboration of doctrines, concepts, conceptions, manuals,

and instructions, participates in the convocations on the specialized line, leads EOD Combat Service, etc.

2.3. *At the tactical level*, within the force category staffs (Land, Air, Naval) and the commands of the components of the force categories (LANDCOM, AIRCOM, NAVCOM), there are at this time several section or office level structures, which are in the organization of operations and training services/offices or resources.

At the level of the two infantry divisions, starting with April 1, 2022, *G-Engineering type structures have been set up*, which are led by a *chief of MILENG (OF-5)* and are organized by an *Operations and EOD Office* and a *Plans and Infrastructure Office*. Below, at the brigade level, there is a position of *MILENG officer* in S.3-Operations.

### **3. The MILENG structures in the organization of NATO commands**

Following the decisions taken at the NATO Summits, the military command structures underwent an extensive transformation process. At the same time, the MILENG command structures underwent major changes. Initially, they had a simpler organization, but with several important and complex areas to manage, these command structures needed to be reorganized as needed.

3.1. *At the strategic level*, according to the organization of this date, the structure within SHAPE is called the *Infrastructure and Engineering Division/Strategic Enablement Directorate* and is headed by a *chief of MILENG*. This department includes two services: The *Plans and Operations Branch* and *Infrastructure and Environmental Branch*. (SHAPE Command Structure without year)

The *Infrastructure and Engineering Division* ensures the coordination and control of capabilities for all aspects of the MILENG line in accordance with MC 560/2 to support SACEUR in fulfilling its command responsibilities. It is headed by a Colonel (OF-5) who is the *Assistant Chief of Staff Infrastructure and Engineering*. Provides specialist MILENG advice to the Command Group and ACO staff. The division incorporates various areas of expertise such as engineering, EOD, environmental protection, energy efficiency, assessment and management of infrastructure, including contracts with the civilian environment. It also manages contributions to C-IED, force protection, and providing life support.

Both services are run by officers with the rank of colonel (OF-5) who have subordinate specialists (Subject Matter Expert) in the fields of planning, operations, information, EOD, C-IED, infrastructure management, environmental protection, etc.

3.2. *At the operational level*, within the NATO command structure there is Joint Force Commands that can effectively execute the command and control over the assigned forces to obtain operational effects in the Joint Operating Area.

A Joint Forces Command is organized in directions that are divided into *Joint-type departments* led by colonels (OF-5). There is a *Joint Engineer Division* within the *Support Directorate*. The Support Directorate is responsible for planning, directing, monitoring, evaluating, and coordinating the functions of the support staff.

The *Joint Engineer Division* within the Support Directorate is led by the Joint Force Engineer – JFENGR and has the following organization: *Engineer Plans Branch* with *Plans Section* and *Infrastructure Section*; *Engineer Operations Branch* with *Operations and Syncro Section* and *Intell & EOD Section*. *Joint Engineer Division* is responsible for providing advice on issues related to the support of the force and the combat support for NATO activities and operations. (AJP-3.12 (C), Allied Joint Doctrine for 2021)

The structure is led by the *chief of MILENG of the joint force*. He is responsible for advising and coordinating all aspects of MILENG for NATO activities and operations within the JOA, in the theater, and for events outside these areas, in NATO Partnership Commitments.

### 3.3. At the tactical level

In the continuation of our analysis we will make brief references to *the MILENG structures within the tactical level commands*, respectively LANDCOM and the commands of the multinational corps and divisions (NRDC, MNC, MND).

**Land Component Command – LANDCOM** is responsible for the coordination and synchronization of NATO and partner land forces, in order to enable the preparation, interoperability, standardization, and management of land space (Allied Land Command without year; The LANDCOM Handbook 2019).

Within LANDCOM we identified *G Engineering Division – GENG Division* which is led by *Assistant Chief of Staff G Engineer – ACOS GENG*, is organized by the Operations Directorate and has the following services/offices: *Operations & Training Branch; Infrastructure & Plans Branch; Coordination/Environmental Protection Office*. (The LANDCOM Handbook 2019, 97-100 )

*GENG Division* has 11 people in peacetime, and in the event of a displacement or crisis, it will increase to 39 people.

*GENG Division* has as current responsibilities the monitoring and evaluation of the necessary capabilities. He provides specialist advice and support for force protection, CIMIC, and other areas. Provides advice on environmental issues and coordinates this area. It also provides feedback to NATO engineers on all identified/learned lessons in the specialty line.

The *ACOS GENG* is the *Chief of MILENG* and *Senior Advisor* of the Commander in all MILENG issues of the GENG.

**The commands of the NATO Multinational Corps** have a high level of operationalization and can deploy quickly at the command of SACEUR, in an area of operations assigned to conduct joint or combined operations. (Rapid Deployable Corps without year; Vision and Mission without year)

These commands are led by a commander, who is assisted by a chief of staff. The deputy chief of staff is subordinated to the line of planning, operations, and support (one-star generals, chiefs of divisions) and other heads of divisions with special destinations. The divisions are divided into services led by officers with the rank of colonel. Depending on the command, the *G-ENG/Engineer Branch* is in the Combat Support Division (NRDC-T) or the Operations Division (NRDC-GR). (NATO Rapid Deployable Corps Greece without year; NATO Rapid Deployable Corps Turkey without year)

*G-ENG/Engineer Branch* within a corps is led by a *Chief of MILENG*, who is also the *Assistant Chief of Staff Engineer- ACOS ENG* and is composed of the following structures: *Engineer Operations Section; Engineer Plans and Infrastructure Section*.

*Engineer Branch* is to advise on all matters relating to the MILENG support of the force and the MILENG support for NATO operations and activities. It also assesses the need for MILENG capabilities and provides specialized advice and support for force protection, CIMIC, environmental protection, and coordination of this field. It also provides feedback for all identified/learned lessons, on a specialized line.

*Engineer Branch* plans, coordinates, and synchronizes all actions related to MILENG support to contribute to the implementation of operational plans, which include MILENG support for the development and maintenance of infrastructure in the AOR, as well as MILENG support to ensure freedom of maneuver/movement.

#### **4. The MILENG structures in the commands of the armies of some NATO member states**

In general, the national armies of NATO member states have a long history. From the earliest times, in their organization were MILENG troops who had complex tasks both in peacetime and during the conduct of combat actions. Due to the complexity of these tasks, which required thorough polytechnic training, there were specialist officers in the command/staff of the armies and units who advised the commanders on the line of MILENG and were able to lead and coordinate all tasks on the line of MILENG.

Subsequently, MILENG entities with a more complex organization appeared in the command structures, dimensioned according to the needs of the moment. These MILENG command structures had to distribute people and tasks in such a way as to ensure communication, cooperation, task performance, resource allocation, and decision-making in the most effective way possible.

In the following lines, we set out to analyze the MILENG command structures within the armies of some NATO member states, based on the information we currently have.

Some of the information about MILENG command structures in the armies of some NATO member states comes from open sources (official army websites or specialized publications), and others were provided to us by MILENG COE. Please note that this information is unclassified.

##### **4.1. Canada**

Canadian Military Engineers, both units and MILENG personnel are found in all Canadian Army force structures/categories. (Canadian Military Engineers without year; NATO 2017)

Regarding the MILENG command structures, at the politico-military level, within the Ministry of Defense, there is an *Assistant Deputy Minister of Infrastructure and Environment*. He leads a Level 1 structure within the Canadian Department of National Defense. The chief is a civilian (lieutenant general equivalent) who reports to the Deputy Minister of Defense and is responsible for all that Canada's defense infrastructure means.

The Chief of Staff of this organization (Chief of Staff) is an engineer with the rank of major general. He is also the *Chief of MILENG – CME* of the Canadian Armed Forces. In this role of chief of MILENG, he is the MILENG adviser to the Chief of the Defense Staff.

At the strategic level – there is a Joint General Staff. There is a *MILENG officer on this staff (MILENG OF-4)*.

At the operational level, there is the Canadian Joint Operations Command which is the level 1 organization that commands all Canadian troops involved in operations. There is a *J Engr (Joint Engineering) structure* run by a *MILENG colonel (OF-5)*. The structure is organized by a number of 20-30 people. The sections of the J Engr structure are *Operations, Plans, Infrastructure, and EOD*.

At the tactical level, there are MILENG command structures within the Canadian Army Headquarters and the Canadian Air Headquarters.

Within the Canadian Army Headquarters, there is a *MILENG colonel (OF-5)* who also holds the position of *Director of the MILENG* as a secondary function. In this capacity, he advises the land force commander on issues of engineering, such as training, force structure, and equipment procurement. Here, too, there is a *MILENG Major (OF-3) position* responsible for MILENG for operations support and staff training. There is also a *MILENG Department* in the procurement structure with land forces equipment, which is headed by a *MILENG lieutenant-colonel (OF-4)*.

Within Division HQ there is a *MILENG officer (Div Engr)*, with the rank of *major (OF-3)*. There is no additional specialist staff.

There is no MILENG staff in the HQ Brigade. When the brigade is deployed, the fighting MILENG regiment within the brigade deploys part of the regiment's staff to form an MILENG Support Coordination Center within the brigade command. It is usually led by the Chief of Operations/Regiment together with a staff team.

Within Canadian Air Headquarters there is a small MILENG structure that has a number of 4-6 people and is led by a MILENG *lieutenant-colonel (OF-4)*.

#### 4.2. United Kingdom

English engineers are found in many theaters of operations, the support of MILENG being needed in any kind of operation, land, air landing, sea landing, or special forces. (The Corps of Royal Engineers without year; NATO 2017, 27-28)

Organization of MILENG command structures. At the strategic (politico-military) level, in the organization of the Ministry of Defense, there is no command structure specific to the MILENG branch. Within the Permanent Joint Headquarters or PJHQ, there is an *officer in the Operations Special Branch* who deals with the problems of these branches, including the MILENG branch.

The MILENG branch is represented at various levels in the military commands, but they focus especially on Capability Development and Procurement. There are MILENG *officers who are assigned to various structures*, such as the Operations Department, which provides expertise and advice specific to the field of MILENG.

*Royal Engineers HQ* operates under the command of the army, whose main mission is to solve all problems on the line of MILENG.

At the operational level, the 8th MILENG Brigade Command is the main structure dealing with the specific problems of the MILENG branch, and its commander is the *chief of the MILENG* of the Joint Forces Group. He provides MILENG advice to all commanders in the land, naval, and air forces. All MILENG specialist are under his direct command.

At the tactical level, there are a number of MILENG structures that provide specialized counseling and lead and coordinate MILENG forces. The division command has in its organization a *senior officer of command MILENG*, with the rank of colonel (OF-5). Such a MILENG officer also exists within the command of the Air Force. MILENG line counseling for Commando forces and Parachute Brigades (Para Bdes) is provided by *the Engineering Regiment* within its own structure. All units at brigade and battalion level when deployed are augmented with a MILENG *Cell*.

#### 4.3. United States of America

At the strategic level, there is a *chief of MILENG* (senior officer of MILENG) for each category of army forces (land forces, naval forces, air forces, and the Marine Corps). (JP 3-34 Joint Engineer Operations 2016)

There is no *chief of MILENG* to subordinate the *chiefs of MILENG to the category of forces*. There is a *senior MILENG officer in J4* in the Joint Staff (JS) (he is a command in the Pentagon, personally composed of each of the six categories of forces). He advises the President and the Vice-President in the performance of his duties and is headed by a Director (DJS), but he advises the staff of the Command and does not subordinate the Chiefs of MILENG within the categories of forces.

At the operational level, there are MILENG *officers* at every command level. At the highest operational level is a Geographical Combatant Command – GCC. There is such a command for every continent/region, and the *senior MILENG officer* is located in J4 and is

known as *J44 MILENG*. Normally, the MILENG officer is a colonel who was a MILENG BDE commander.

It is subordinated to the Service Component Commands - SCC. Each GCC has an SCC responsible for each of the four components of the force structure below it (land, naval, air, and marines' forces). Within the SSC there is a *MILENG Service*. For example, the US Army Europe (USAREUR) is the European Army under command of Europe (SCC), which is the GCC. The USAREUR MILENG officer is *Deputy Chief of Staff for Engineering – DCSENG*. Normally, the MILENG officer is a colonel who was a MILENG battalion commander.

The smallest operational-level structure in the US military is the corps. There are four corps in the US military. Each corps has a MILENG Section known as the *Corps Engineer Section – CES*. Normally, the head of the MILENG structure has the rank of colonel.

At the tactical level, the greatest unit in the division. Within the division, the command is a *MILENG Section* known as *Division Engineer - DIVENG*. Normally, the head of DIVENG is a lieutenant colonel who is a former MILENG battalion commander.

There is a MILENG battalion in the brigade-type battle group, and the battalion commander is *the chief of the brigade MILENG*. Within the brigade staff, there is a MILENG officer, with the rank of major, who fulfills the specific attributions of the staff and is within S.3-Operations.

There is not normally a MILENG officer in the maneuvering battalion in the General Staff. The commander of the MILENG platoon (for light units) or the commander of the MILENG company (for heavy units) also performs the duties of the *chief of MILENG* during the conduct of combat actions.

At each command level, the Chief Engineer/Engineer Officer and his subordinate staff contribute to the development and implementation of plans for the execution of current/future operations and will synchronize the actions of the MILENG and support structures. The infrastructure part is also managed by these MILENG structures. In the US military, the EOD is not part of the MILENG.

#### *4.4. Germany*

Germany has implemented MILENG support functions in accordance with NATO Military Committee Policy no. MC 560/2 in the regulation "MILENG Branch in the Bundeswehr". (MILENG in German Bundeswehr without year; NATO 2017, 19-22)

Germany uses the term NATO – "MILENG" because there is no German equivalent military term that encompasses the broad field within the meaning of NATO. The German Army's MILENG branch as defined by NATO supports military operations at all stages, helping to ensure the mobility of its own forces or the counter-mobility of enemy forces, providing support for maintaining operational capability, contributing to force protection, developing and managing deployed forces infrastructure, incorporating environmental protection and contributing substantially to the control of improvised explosive devices. The MILENG branch contributes, regardless of component or service, to the shaping of the physical environment. MILENG capabilities are fragmented according to needs in different structures of the Ministry of Defense, and different military and civilian services.

##### *Organization of command structures*

Within the Ministry of Defense, the general coordinating authority for the MILENG branch is the *General Directorate for Strategies and Operations*. A *coordinating group for the MILENG branch* consisting of representatives of the Ministry of Defense and all civil and military services chaired by a *Bundeswehr Senior Joint Engineer*, who is a member of the land forces, and a vice-president who is in charge of the *Infrastructure Service, Protection Environment and Services*.



For the areas and specialized aspects of MILENG, the authority is at the level of the *Directorate General* of the Ministry of Defense, for example, the policy of forces for EOD and infrastructure, environmental protection, and services for infrastructure in operations.

C2 MILENG staff structures for coordinating and assigning tasks on the MILENG line exist at the level of the MILENG battalion, brigade, and division.

The *Chief of Engineering of the German Army (Senior Joint Engineer Bundeswehr - SJEbw)* is the senior MILENG officer in the land forces or the commander of the *German Army Engineering Training Center*.

Infrastructure, environmental protection and services. The *Federal Office for Infrastructure, Environmental Protection and Services (BAIUDBw)* is responsible for managing infrastructure in missions. This includes the planning, contracting, and management of construction tasks and the operation of bases and installations, with the specialized civilian and military personnel of this service. The BAIUDBw manages parts of the Central European pipeline system and is the planning and execution authority for construction, maintenance, and support. The service is provided by the *Deputy Chief of Engineering in the Army* through the Director of Infrastructure.

According to information provided by MILENG COE, there is a senior MILENG officer in the Department of Defense. At the operational level, there is no MILENG manager.

There is a *MILENG service* at the Army Concepts and Capabilities Development Center. The MILENG Branch is represented from the level of the brigade command upwards. At the division command level, several engineering and C-IED positions are part of the G.3-Operations structure. At the army corps level, the MILENG structures is established in the multinational environment (1GNC/EUROCORPS, etc.).

#### 4.5. France

The MILENG branch of the French Army consists of three components (security, infrastructure, and combat), with about 28,000 men, which also includes the staff of the MILENG School. (French MILENG without year; NATO MILENG 2017, 19-20)

Regarding the organization of MILENG command structures, the brigadier general who commands the school is *the chief of the MILENG* in the army. Therefore, he has authority over all MILENG structures, acting at inter-ministerial (to the Security Component) and international (NATO, EU) levels.

There are no MILENG structures in the strategic and operational level commands. The commander of the MILENG School is the *chief of the MILENG* of the combined forces. The staff of the MILENG School is the main component that ensures the specialized expertise. In the French Army, the MILENG branch also includes EOD, as well as the military search.

There are *MILENG Services* or battalion-level *cells*. Each MILENG battalion has its own staff (there is 1 MILENG battalion/brigade and 1 MILENG battalion/division), at the brigade level there is a MILENG cell – Eng Cell named B3-2D (1 brigade), at the division posts of MILENG and C-IED are part of the structure G.3-Operations/G-ENG (1/division command each), at the level of the Corps the MILENG structures (MILENG service)/JENG is established as in the NATO multinational environment and are called of G-ENG (1/CRR FR, 1/EU HQ). At any command level, the *EOD- C-IED Cell* is part of the MILENG field.

### **5. Comparative analysis of the MILENG structures from the commands of the Romanian Army, with those from NATO or within the armies of some member states**

After a detailed analysis of the MILENG command structures in the organization of the Romanian Army at the strategic, operational, and tactical level, we find that they exist only in certain commands and that in general, they are only *office level* with 2-3 positions or

*staff officer* within the commands of units. There are a few exceptions, within the Air Forces Staff there is an *Infrastructure and Engineering Section* structure within the resources module and an *Engineering and EOD Training Office* combined with *CBRN and infantry shooting* in module A.3-Operations, and in the organization of division commands, starting with April 1, 2022, *G-Engineering* type structures appeared, within the resources mode, which replaced the *MILENG Compartment* within the 4th Infantry Division HQ and the *MILENG Office* within the 2nd Infantry Division HQ.

These structures are uneven, undersized, and combined with other specialties or areas of responsibility unrelated to the MILENG branch. For example, in the Air Forces Staff the MILENG Training Office is combined with CBRN and Infantry Shooting. At the NAVCOM, the office is combined with emergencies and force protection. The MILENG structures contribute with different capabilities for emergencies, as well as for the force protection, but in the Romanian Army, these are not areas of responsibility of the MILENG branch. The structures are organized by a few officers and non-commissioned officers, some of whom are not even MILENG specialists (for example, the NAVCOM office is headed by a naval officer). Also, some structures are found only in the organization of the Staffs of the Force Categories (Land Forces Staff, Air Forces Staff), and others only in the organization of the Commands of the Components of the Force Categories (LANDCOM, NAVCOM).

From my point of view, within the Staffs of the Force Categories, there must be MILENG structures that can have attributions on the line of instruction, education, endowment with specific technique and equipment, interoperability, different regulations in branch, elaboration of normative acts specific (doctrines, concepts, manuals, and instructions), relationship with NATO Training/Excellence Centers for knowledge of novelty elements in the evolution of the branch/specialty, etc., but within the Operational Commands (National Military Command Center, JFC, LANDCOM, AIRCOM, NAVCOM, Division HQ) there must be well-organized MILENG structures, which have the full range of capabilities provided in the NATO Doctrine for MILENG and which can handle all issues on the line of MILENG.

#### *5.1. Comparative analysis of the MILENG structures within the Romanian commands, with those within the NATO commands*

Compared to the MILENG structures within the NATO headquarters, we highlight some similarities and differences, which we will specify in the lines below.

In terms of *similarities*, both within the Romanian Army commands and the NATO commands at the strategic, operational, and tactical levels, there are MILENG command structures. These MILENG command structures have areas of expertise in the fields of engineering and EOD. He also manages the actions of engineers for contributions to the fields of C-IED, force protection, and providing life support. The head of the structure, together with his subordinate staff, provides specialist advice for the command group and the staff of the strategic, operational, and tactical level command. The staff within the MILENG structures of the Romanian and NATO commands, from all hierarchical levels, support the planning process by providing MILENG data. Participates as experts in groups organized in the field of target management. At the strategic level, the Romanian and NATO engineers offer specialized expertise in politics, doctrine, defense planning, force generation, training, procedures, and standardization on the line of MILENG.

As for the differences, they are much more numerous. First of all, there are indeed MILENG command structures in the Romanian Army, at every hierarchical level (strategic, operational, and tactical) but they are not properly organized. In the sense that at almost all hierarchical levels there are office-type structures, with two or three functions, so they are insufficiently sized. There are two exceptions, one is at Land Forces Staff, where we have an

Infrastructure and Engineering Department, organized in two offices and two compartments, and also in the two divisions, where we have G-MILENG structures organized in two offices. Compared to these, the MILENG structures within NATO headquarters have a complex organization, and a large staff. Within SHAPE, JFCs, LANDCOM, NRDC commands, and multinational divisions commands, there are Infrastructure and Engineering Division/SHAPE, Joint Engineer Division/JFC) or GENG (LANDCOM, NRDC-GR, NRDC-T, MNC-SE, MND-SE). For example, within LANDCOM, the MILENG structure has several 11 people, which can be increased to a number of 39 people if necessary. Secondly, within NATO commands there is the function of the *chief of MILENG* who is the main advisor in the line of MILENG and who has the technical and coordinating authority over all the structures of MILENG (command and force), located at the subordinate echelons. The heads of the MILENG offices within the Romanian commands do not have the technical and coordination authority over all the MILENG structures.

As for the capabilities in organizing the MILENG structures of NATO headquarters, they are service/section/office/compartment level, depending on the level, and consist of MILENG plans, MILENG operations, MILENG intelligence, infrastructure management (provides expertise for NSIP), including MILENG contracts, MILENG resources/logistics, environmental protection, EOD. Also, these MILENG structures within NATO headquarters manage the MILENG contributions to force protection, C-IED, military search, etc. Compared to these, the Romanian Army MILENG offices have limited or no capabilities in terms of plans, MILENG operations management, MILENG intelligence, infrastructure management, civil contracts, environmental protection, EOD, and MILENG logistics. Within the Defense Staff, the MILENG Offices can contribute to the process of planning and conducting MILENG operations, by drawing up specific annexes to the elaborated plans. They do not have a database with MILENG data and information and cannot manage MILENG intelligence. They cannot manage infrastructure (including the management and development of NSIP-funded infrastructure), civil engineering contracts, or environmental protection. In the Romanian Army, the management of these fields belongs to other structures. Also, issues related to MILENG resources, Class IV materials, and MILENG assets are managed by the logistics structure and not by the MILENG structure. The fields of EOD and C-IED can be managed to a limited extent, as there are not enough specialized personnel employed in the Romanian MILENG structures. Within the Defense Staff and the Land Forces Staff, the field of C-IED is attached to the MILENG and EOD Office. Both offices are located within the operations structures. C-IED is together MILENG and EOD, but office staff can only partially manage this area (C-IED).

There are also two exceptions regarding the capabilities of the MILENG structures within the Romanian commands. At Air Forces Staff there is the *Infrastructure and Engineering Section*, which can manage the part of the infrastructure that belongs to the Air Force and also conclude engineering contracts with civilian contractors. Also, at the level of the two Romanian Infantry Divisions, there are *G-MILENG-type structures* that have capabilities of planning and operations of MILENG, infrastructure management, and EOD.

## *5.2. Comparative analysis of the MILENG structures within the Romanian commands, with those within the armies of some NATO member states*

In order to make a comparative analysis of the MILENG structures within the Romanian commands with those within the commands belonging to some NATO member armies, we normally carried out a larger study that included a number of 12 states (USA, Canada, England, France, Germany, Italy, Türkiye, Spain, Poland, Hungary, Belgium, the Czech Republic), but due to lack of space for this study, I have detailed in the above lines the command structures for only the most representative of them, namely: USA, England,

Germany, France and Canada, but in my analysis I will briefly present some conclusions from the study of the 12 states.

As for the presence of MILENG command structures at the strategic, operational and tactical levels, they exist in the armies of those states. These can be at the level of MILENG Directorate at the strategic level, as in the case of Germany, at the level of the MILENG Department in the case of Türkiye or at the MILENG Command in the case of England, Spain and Italy. At the operational level, we identified a J-MILENG structure within the Canadian Joint Operations Command and a MILENG Directorate within the General Command of the Polish Armed Forces. At the tactical level we identify a Land Force MILENG Command in the Spanish Army, services, sections or engineering officers for the other armies.

Within large armies of some NATO member states, there are numerous structures of MILENG forces (for example in the armies of the USA, France, Italy) and then, implicitly, they are well represented in the commands, where there are ample command structures, with numerous staff. In the case of smaller armies with fewer MILENG forces, there are generally staff officers in command structures or they are completely absent. Their duties are taken over by officers in charge of operations or logistics structures. A special case is France, where the structure that leads everything that means MILENG in the French Army, is the MILENG School, and the school commander also fulfills the function of head of MILENG.

As for the chief of MILENG as the commander's adviser and technical authority for MILENG coordination at various levels, he is well represented in the US, Canadian, German, British, Türkiye and French armies. In the Romanian Army, this function appears only in the commands of the divisions, where the head of the MILENG leads a GENG type structure.

As capabilities present in MILENG command structures, capabilities similar to those specified in NATO doctrinal provisions (plans, operations, infrastructure, EOD, etc.) are found in the US military (in the US military, the EOD is not part of MILENG branch), Germany, France, Canada, Italy, Poland, Türkiye, Spain, etc.

The issue is quite complex and a broader analysis of these MILENG structures will be made in a further personal study.

As a conclusion, following the brief analysis, we find that compared to the MILENG command structures within the Romanian Army, in foreign armies with a large number of soldiers, the MILENG command structures are at the level of directorate, department or are led by a MILENG chief, are staffed with more staff, have staffing capabilities similar to those set out in the NATO Doctrine for MILENG, and are therefore able to properly manage all peace, crisis, war and post-conflict situations.

## Conclusions

The principles of command and control of MILENG command structures stipulated in the national doctrinal provisions approved in 2016, which were developed in accordance with the policies issued by the NATO Military Committee and the NATO Doctrine for MILENG promulgated in 2014, have not been properly implemented in the Romanian Army. Although the documents in question provided for the existence of MILENG command structures with a complex organization, led by a *chief of MILENG* acting as principal advisor to the commander and coordinator of MILENG support at every hierarchical, strategic, operational and tactical level, they were not implemented to date only to a small extent. Both the development concepts of the MILENG branch approved by the military leaders and the Romanian doctrinal provisions that provided for the implementation of NATO standards generally remained at the level of theoretical clarifications. Contrary to these provisions, which were analyzed and approved by commissions composed of specialists in the field of branches or by commissions for the analysis and approval of all specific normative acts, the MILENG command structures

remained undersized, not being able to manage correspondingly the complex problems of the MILENG branch.

As the new NATO doctrine for MILENG is being implemented within the Romanian Army, after its approval, we will make concrete proposals regarding the MILENG command structures, in accordance with the new doctrinal provisions. Our proposals to the decision-makers will refer to the fact that these MILENG structures must be found in all the commands of the Romanian Army at the strategic, operational and tactical levels and must be led by a *chief of MILENG* with the role of advisor on the line of specialty, technical authority and coordination on the MILENG capabilities of subordinate structures. Also, these MILENG structures in the staff of our commands must be able to ensure, on the one hand, the correspondence of duties with those of similar structures within the Alliance's commands and, on the other hand, the possibility of exercising the command on behalf of the commander and control over all MILENG abilities.

New MILENG command structures must include in the organization chart at least the following components: *MILENG intelligence*; *MILENG plans*; *infrastructure*; *MILENG resources*; *current operations of MILENG*; EOD. These structures must manage the following areas of expertise, combat engineering support, force engineering support and EOD. He must also coordinate the work of engineers to contribute to C-IED; force protection; environment protection; military search; infrastructure management, including civil engineering contracts; ensuring life support.

## Bibliography

- n.d. *Polish Armed Forces*. Accessed November 08, 2021. [https://en.wikipedia.org/wiki/Polish\\_Armed\\_Forces](https://en.wikipedia.org/wiki/Polish_Armed_Forces).
2021. *AJP-3.12 (C), Allied Joint Doctrine for MILENG*.
- n.d. *Allied Land Command*. Accessed June 09, 2022. <https://lc.nato.int/>.
- n.d. *Canadian Military Engineers*. Accessed June 06, 2022. <https://milengcoe.org/nations/Pages/Canada.aspx>.
2021. *Carta albă a apărării*. București.
- n.d. *French MILENG*. Accessed June 09, 2022. <https://milengcoe.org/nations/Pages/France.aspx>.
2016. *JP 3-34 Joint Engineer Operations*.
2006. *Legea nr. 346 privind organizarea și funcționarea Ministerului Apărării Naționale*. Accessed June 06, 2022. [https://www.mapn.ro/legislatie/documente/N-Legea\\_346\\_2006\\_republicata.pdf](https://www.mapn.ro/legislatie/documente/N-Legea_346_2006_republicata.pdf)
2017. *MC 0560/2 Military Committee Policy for*.
- n.d. *Military Engineers in the German Bundeswehr*. Accessed June 06, 2022. <https://milengcoe.org/nations/Pages/Germany.aspx>.
- n.d. *Military Engineers in the Italian Army*. Accessed June 09, 2022. <https://milengcoe.org/nations/Pages/Italy.aspx>.
- Military Tehnology Magazin, vol. XLI, Special Issue*. 2017. "NATO MILENG".
- n.d. *Ministry of National Defence*. Accessed June 09, 2022. <https://www.gov.pl/web/national-defence/briggen-radml>.
2019. *NATO Encyclopedia 2019*. Brussels.
- n.d. *NATO Rapid Deployable Corps Greece*. Accessed June 09, 2022. <https://nrdc.gr/>.
- n.d. *NATO Rapid Deployable Corps Türkiye*. Accessed June 09, 2022. <https://www.hrf.tr.nato.int/>.
- n.d. *Rapid Deployable Corps*. Accessed June 09, 2022. [https://www.nato.int/cps/en/natohq/topics\\_50088.htm](https://www.nato.int/cps/en/natohq/topics_50088.htm).

- n.d. *SHAPE Command Structure*. Accessed June 09, 2022. <https://shape.nato.int/page8251027.aspx>.
2016. *SMG-3, Manualul de planificare al operațiilor*.
2021. *Strategia Militară a României*. București.
- n.d. *The Corps of Polish Engineers*. Accessed June 09, 2022. <https://milengcoe.org/nations/Pages/Poland.aspx>.
- n.d. *The Corps of Royal Engineers*. Accessed June 06, 2022. <https://milengcoe.org/nations/Pages/United%20Kingdom.aspx>.
2019. *The LANDCOM Handbook*.
- n.d. *Vision and Mission*. Accessed June 09, 2022. <http://www.hrf.tu.nato.int/vision-mission.html>.
2016. G-1, *Doctrina sprijinului de geniu în operațiile întrunite*. Bucharest.